REMARKS

In the Office Action mailed 14 December 2006, the examiner maintains the position that independent claims 1, 21, 41, 49, and 57 are obvious under §103 over Fitton (US2004/0028013) in view of Smee (US6990137). In particular, the examiner asserts that Fitton teaches every aspect of the independent claims except that alleged correlation of Fitton is an impairment correlation matrix. For this teaching, the examiner relies on Smee. The applicants respectfully disagree and offer the following remarks in response.

The claimed invention relates to the estimation of impairment correlation matrices for spread spectrum receivers. Independent claims 1, 21, 41, 49, and 57 each require estimating first and second impairment correlation matrices based on despread symbols received over multiple paths of a multi-path channel, and deriving a final impairment correlation matrix based on the first and second impairment correlation matrices. As shown in Figure 4 and claimed in independent claims 41 and 49, the receiver may suppress interference in the received signal by combining the despread symbols using weighting factors determined from the final impairment correlation matrix.

Fitton describes a spread spectrum wireless receiver that comprises interference suppression circuitry and a RAKE receiver having a plurality of RAKE fingers 514. The interference suppression circuitry estimates interference present in a received signal, respreads the interference estimate, and subtracts the interference estimate from the received signal to generate interference suppressed signals. Subsequently, each RAKE finger 514 in the RAKE receiver despreads the interference suppressed signals according to conventional RAKE receiver procedures to generate despread symbols, and combiner 528 combines the despread symbols to generate symbol estimates of the received signal. See Figure 5 and ¶s [0088] – [0094].

In rejecting the independent claims, the examiner asserts that the RAKE fingers 514 1 – N in Fitton estimate first and second correlations based on despread symbols received over multiple paths of a multi-path channel. Thus, the examiner asserts that the RAKE fingers 514 of Fitton correspond to the claimed first and second correlation matrix estimators/estimation. The examiner further asserts that the combiner 528 of Figure 5 derives the claimed final correlation matrix.

The examiner's assertions directly contradict the teachings of Fitton and the general understanding of RAKE receiver operations. Even if it could be argued that the RAKE fingers 514 1-N of Fitton generate correlations, such RAKE fingers would never be interpreted as generating impairment correlations (values that illustrate the correlation between impairments). Instead, the RAKE fingers 514 1-N of Fitton despread the received signal by correlating a spreading code with a delayed and interference-suppressed version of the received signal (see ¶s [0083] – [0087] and Figure 4). Thus, according to the teachings of Fitton, each RAKE finger 514 generates an interference-suppressed despread symbol for a particular path of the multi-path channel. It is important to note that because RAKE fingers 514 actually generate the despread symbols, the RAKE fingers 514 do not also generate something else (e.g., impairment correlations) based on despread symbols.

The applicants note that just because the RAKE fingers of Fitton may teach performing some kind of correlation operation (e.g., to generate the despread symbols), does not mean that the RAKE fingers of Fitton may also be used to generate any type of correlation or correlation matrix, such as the claimed impairment correlation matrices. In fact, such an interpretation contradicts the fundamental operation of RAKE fingers and RAKE receivers understood by those skilled in the art.

In addition and contrary to the examiner's assertions, the combiner 528 in Fitton does not derive any type of correlation or correlation matrix, much less the claimed final impairment

correlation matrix. Instead, combiner 528 sums the <u>despread symbols</u> output by each RAKE finger 514 to generate <u>symbol estimates</u> for the received signal, as well understood in the art.

Nothing in Fitton teaches or suggests determining any type of <u>impairment correlation matrix</u>, much less the first and second impairment correlation matrices or the final impairment correlation matrix of independent claims 1, 21, 41, 49, and 57. Further, one skilled in the art would not modify the RAKE fingers of Fitton to generate impairment correlation matrices. Thus, nothing in Smee will correct the deficiencies of Fitton. For at least this reason, the independent claims and all claims depending therefrom are patentably distinct from Fitton and/or Smee.

Independent claims 41 and 49 and dependent claim 15 further require combining the despread symbols using weighting factors determined from the final impairment correlation matrix to suppress interference. In addition to asserting that the combiner 528 of Fitton generates the final impairment correlation matrix, the examiner also asserts that the combiner 528 combines the despread symbols using weighting factors determined from the final impairment correlation matrix. Such an assertion makes no sense. As clearly shown by Figure 5 of Fitton, combiner 528 does nothing more than combine the despread symbols output by the RAKE fingers 514. Nothing in Fitton supports the examiner's conclusion that the combiner generates a final impairment correlation matrix or uses weighting factors based on the final impairment correlation matrix to combine the despread symbols for any reason, much less to suppress interference. In fact, Fitton specifically teaches suppressing interference from the received signal <u>before</u> processing the received signal with the RAKE fingers 514 and combiner 528 (see ¶s [0083] – [0094] and Figure 5). As such, the rejections cited against dependent claim 15 and independent claims 41 and 49 fail for this reason as well.
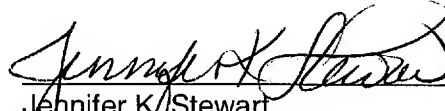
In light of the above remarks, the applicants request that the examiner withdraw all rejections cited against pending claims 1 – 60, and issue a Notice of Allowance.

In addition to the above remarks, the applicants amend independent claims 1, 21, 41, 49, and 57 to clarify the claim language. No new matter is added. Further, these amendments were not made in response to the pending rejections and the above arguments do not rely on these amendments.

The applicants believe the above response addresses all pending issues. However, should any issues remain, the applicants request that the examiner call the undersigned so that any such issues may be resolved.

Respectfully submitted,

COATS & BENNETT, P.L.L.C.

Dated: 1 February 2008

Jennifer K. Stewart
Registration No.: 53,639

1400 Crescent Green, Suite 300
Cary, NC 27518
Telephone: (919) 854-1844
Facsimile: (919) 854-2084